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ON "PSYCHOLOGY AS THE BEHAVIORIST VIEWS IT."

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When we speak of a science, we have in mind a logically organized body of knowledge that has resulted from certain methods of attacking the problems presented by a particular subject-matter. The methods of science are all, in the last resort, observational; the problems of science are all, in the last resort, analytical. The subject-matter of a given science may be indicated in two different ways: by a simple enumeration of objects, or by a characterization of the point of view from which the science in question regards the common subject-matter of all science, namely, human experience. Thus we may say that our psychology will deal with such things as perceptions, feelings, thoughts, or we may say that psychology, dealing "in some sort with the whole of experience," is to be distinguished as "individualistic" from other sciences which are "universalistic." It is clear that a characterization of this kind, though it necessarily transcends the limits of the science in order to show how those limits are drawn, is far more satisfactory than a mere list of objects; and psychology, these many years past, has therefore had recourse to it.[1]

[1] J. Ward, "Psychology," Encyc. Brit., XX., 1886, 38 (and later); R. Avenarius, "Bemerkungen zum Begriff des Gegenstandes der Psychologie," *Vjs. f. wiss. Phil.*, XVIII., 1894, 418; H. Ebbinghaus, "Grundzüge der Psych.," I., 1897, 8 (and later editions). On the general subject, cf. E. B. Titchener, "Psychology: Science or Technology?", in *Pop. Sci. Mo.*, LXXXIV., 1914, 39 ff.

Instead, however, of calling psychology with Ward the "science of experience regarded objectively from the individualistic standpoint," or with Avenarius the "science of experience in general, so far as experience depends upon System C," or with Külpe the "science of the facts of experience in their dependency upon experiencing individuals," or something of that sort, we are accustomed to speak of it as the "science of mind." No harm would be done, if we and our readers always remembered what "mind," as used in a scientific context, must mean. Harm begins at once when we forget that scientific meaning, and start out from the common-sense or traditional significance of the word; when we equate "mind" with "consciousness," which we take as the equivalent of "awareness," and when we set off a group of "conscious phenomena" as the peculiar subject-matter of psychology. I do not think that modern psychologists can fairly be charged with neglect of their duty to correct these errors; it seems to me, on the contrary, that our leaders are painfully careful to set their house in logical order. But habits of speech are inveterate, and common sense is extraordinarily tenacious of life: small wonder, then, that misunderstandings should arise. It is, for example, a misunderstanding that has prompted the polemical paragraphs of Watson's recent articles on what, I suppose, we must be content to call Behaviorism.[2]

This doctrine, as set forth by Watson, has two sides, positive and negative. On the positive side, psychology is required to exchange its individualistic standpoint for the universalistic; it is to be "a purely objective experimental branch of natural science" in the sense in which physics and chemistry are natural sciences.[3] It is to concern itself solely with the changes set up, by way of receiving organ and nervous system, in muscle and gland.[4] It is differentiated from its sister sciences of life partly by its special point of view, partly by the goal which it strives to attain. The changes which it

[2] J. B. Watson, "Psychology as the Behaviorist Views It," *Psych. Rev.*, XX., 1913, 158 ff. (to be referred to in the future as *A*); "Image and Affection in Behavior," *Jour. Phil. Psych. Sci. Meth.*, X., 1913, 421 ff. (to be referred to in the future as *B*).

[3] *A*, 158, 176 f.

[4] *B*, 427 f.

studies are to be approached from the point of view of adjustment to environment; its categories are stimulus and response, heredity and habit.[5] Differentiation, however, is not to be understood as separation; there is now no barrier between psychology and the other "natural" sciences; in the long run behavior will appear as a matter of physical and chemical causation,[6] while nevertheless, as behavior, it is the subject-matter of the special science of psychology, to be interpreted and arranged under the rubrics just mentioned. The erection of this special science is both justified and made possible by the practical goal of behaviorism, which is the working out of general and special methods for the control of behavior, the regulation and control of evolution as a whole.[7]

On the negative side, again, psychology is enjoined by the behaviorist to ignore, even if it does not deny, those modes of human experience with which ordinary psychology is concerned, and in particular to reject the psychological method of introspection. "Consciousness in a psychological sense" may be dispensed with;[8] consciousness, in the sense of a tool or instrument with which all men of science work, may be utilized by the new psychology without scruple and without examination.[9] Imagery, the "inner stronghold of a psychology based on introspection," is denied outright; one of Watson's "principal contentions" is "that there are no centrally initiated processes."[10] And if consciousness may be dispensed with, self-observation and the introspective reports that result from it are to be treated in even more summary fashion; they are to be "eliminated."[11] There will be no real loss; for most of the essential problems with which psychology as an introspective science now concerns itself are open to behaviorist treatment, and the residue may "in all probability be phrased in such a way that refined methods in behavior (which certainly must come) will lead to their solution."[12]

[5] *A*, 167, 177.

[6] *A*, 173, 177.

[7] *A*, 158, 162, 168, 177.

[8] *A*, 161, 163, 175, 176 f.

[9] *A*, 175, 176.

[10] *B*, 423. The statement is qualified in a footnote; I return to the point later.

[11] *B*, 428; *A*, 158, 163, 166, 170, 175.

[12] *A*, 177; *B*, 428.

Such, in outline, is "psychology as the behaviorist views it." Watson, of course, goes into some amount of detail, offering illustration and personal explanation, as well as attacking the method and problems of current psychology. But before I follow him on these various paths, I should like to record two general impressions that the reading of his articles has made upon me. The first impression is that of their unhistorical character; and the second is that of their logical irrelevance to psychology as psychology is ordinarily understood.

I call the articles unhistorical because they give no hint that any similar revolt against an established psychology had taken place earlier in psychological history. Yet one need go no farther back than Comte to find a parallel. Comte's rejection of introspection has often been referred to: let me now quote another passage in which he sums up his attack upon ideology.

"It is evident, first, that no function can be studied but with relation to the organ that fulfils it or to the phenomena of its fulfilment; and, in the second place, that the affective functions, and yet more the intellectual, exhibit in respect of their fulfilment the peculiar characteristic that they cannot be directly observed during the actual course of this fulfilment, but only in its more or less immediate and more or less permanent results. There are then only two different ways of studying scientifically such an order of functions: we must either determine, with all attainable precision, the various organic conditions on which they depend,—and this is the chief object of phrenological physiology; or we must observe the consequence for conduct of intellectual and moral acts,—and this belongs rather to natural history . . .; these two inseparable aspects of one and the same subject being, of course, always so conceived that each may throw light on the other. Thus regarded, this great study is seen to be inseparably connected on the one hand with the whole . . . of natural philosophy, and especially with the fundamental doctrines of biology; and, on the other hand, with the whole of scientific history, of the animals as well as of man, and even of humanity. But when, by the pretended method of psychology, we discard absolutely from our subject-matter the consideration both of the agent and of the act [that is, of the organ of function and of the result of its exercise], what more is there left to occupy the mind than an unintelligible logomachy, in which merely nominal entities are everywhere substituted for scientific phenomena . . .? The most difficult study of all is thus placed at once in a state of complete isolation, without any possible point of support in the simpler and more perfect sciences, over which it is proposed, on the contrary, to give it sovereign rule

On these two points, all psychologists, however extreme their differences in other regards, are found to agree."[13]

Not Watson himself could be more outspoken or more severe! But we need not go back to Comte and the thirties; we need go only to Cournot and the year 1851. After a sharp criticism of introspection, Cournot writes:

"So we see that the most useful observations on the intellectual and moral nature of man, observations gathered not by philosophers disposed to theories and systems, but by men gifted with the true spirit of observation and prepared to grasp the practical side of things,—by moralists, historians, men of affairs, legislators, instructors of youth,—have not as a rule been the fruit of a solitary contemplation and an internal study of the facts of consciousness, but far rather the result of an attentive study of the behavior (*conduite*) of men placed in various situations, subjected to passions and influences of all sorts."[14]

Here we are hardly without the circle of those "fifty-odd years" which Watson believes—how mistakenly!—have been "devoted to the study of states of consciousness."[15] It would not be difficult to cross that line;[16] but it is unnecessary. My point is that Watson's behaviorism is neither so revolutionary nor so modern as a reader unversed in history might be led to imagine; and that as psychology has weathered similar proposals in the past,—and, I hope and think, has benefited by the storm,—so also it may weather and be benefited by this latest trial of its staunchness.[17]

[13] A. Comte, "Cours de philosophie positive," III., 1838, 774 ff.; the translation of H. Martineau ("The Positive Philosophy of Auguste Comte," 1856, 383 f.) is here inadequate. The polemic against introspection will be found in "Cours," I., 1830, 34 ff.

[14] A. A. Cournot, "Essai sur les fondements de nos connaissances," etc., II., 1851, 319.

[15] *A*, 174. I have shown in my "Experimental Psychology" that the experimental period falls into fairly well-marked sub-periods.

[16] I have especially in mind Lange's chapter on "Scientific Psychology" (1866) and Maudsley's on the "Method of the Study of Mind" (1867 and later).

[17] "Should human psychologists fail to look with favor upon our overtures and refuse to modify their position," Watson writes, "the behaviorists will be driven to using human beings as subjects and to employ methods of investigation which are exactly comparable to those now employed in the animal work" (*A*, 159). The "overtures" seem to consist in the familiar "Ducky, ducky, come and be killed!" But, that apart, why should anything

The second general impression that I record is that of the logical irrelevance of Watson's programme to what is currently called psychology. For suppose that that programme were carried out to its last detail: how would introspective psychology be affected? Why, those who were interested in the method and results of introspection would simply start out where Watson had left off; the universalistic psychology being completed, it would be in order for the individualistic to be begun. A shift of standpoint over against the world of experience means the appearance of a new subject-matter, or (more strictly) of a new aspect of the common subject-matter; and any one aspect has the same claim to scientific consideration as any other; nor is there in science a Congregation of the Index to allow this and to forbid that. The behaviorist may, if he will, ignore "consciousness in a psychological sense"; he may use consciousness as a tool without making it "a special object of observation"; there is none to say him nay; but why should not some one who is not a behaviorist scrutinize what he has ignored, and try to find out empirically of what materials this particular tool is made? Logically, so far as I can see, behaviorism is irrelevant to introspective psychology. Materially, I believe that psychology will be furthered by it, since increased knowledge of the bodily mechanisms, of anything that pertains to Avenarius' System C, means greater stability of certain parts of the system of psychology. Neither logically nor materially can behaviorism "replace" psychology.

Impressions, however, must give way to closer argument: we must view Watson's articles at shorter range. And we shall, perhaps, make most progress if we begin with his pronouncements regarding the failure of experimental psychology.

Psychology, we are told, has failed signally, during the fifty-odd years of its existence, to make good its claim as a natural science. Its present condition is chaotic. The chances are that such ques-

that the "human psychologist" does or fails to do "drive" the behaviorist to do anything? I hope that Watson will find the opportunity to employ human subjects; I hope that he will find them (he will pardon the word) intelligent; I shall be honestly interested in his results.

tions as those of the extensive attribute of auditory and the intensive attribute of visual sensations, or the differences obtaining between sensation and image, will be debated two hundred years hence as inconclusively as they are debated today. Psychological method is esoteric. It has proved unable to grapple with such matters as imagination, judgment, reasoning, conception; these topics have simply become threadbare with much handling. Functional psychology is at fault no less than systematic and structural psychology. Only those "branches of psychology which have already partially withdrawn from the parent," and which are consequently less dependent upon introspection,—experimental pedagogy, the psychology of drugs, the psychology of advertising, legal psychology, the psychology of tests, and psychopathology,—are vigorous growths. The complete elimination of introspection from these disciplines will make their results still more valuable, and will keep them—as psychology itself emphatically is not—in touch with "problems which vitally concern human interest."[18]

That, I believe, is a fair statement of Watson's position; it is given largely in his own words. I have to reply, first, that fifty-odd years is not necessarily a long period in the history of an experimental science. It is not long, of course, regarded as mere duration: for it is in the sixteenth century that "the physicist abandons scholastic speculation and begins to study nature in the language of experiment,"[19] while it is only in the middle of the nineteenth that psychology becomes experimental. It might be long, in a transferred sense, if it were crowded with workers: but the number of productive students in "systematic, structural and functional" psychology does not compare with the number in physics or chemistry.[20] Has Watson, I wonder, ever counted the number of experimental papers that deal with imagination, judgment, reasoning and conception? It is notoriously difficult to trace beginnings; but we shall not

[18] *A*, 163, 176; 165; 164; 163; 173 ff.; 165; 169 f.; 170, 176.

[19] F. Cajori, "A History of Physics," 1899, 27.

[20] Mr. H. G. Bishop has kindly listed for me the experimental papers in psychology, physics and chemistry recorded in the last five volumes of Fock's *Bibliographischer Monatsbericht*. The ratio is approximately 1 : 9.5 : 44. Account is here taken of the psychological studies to be found under "Medizin," as well as of those under "Philosophie und Psychologie."

have gone far wrong if we date the first overt attempts to bring these complexes under experimental control from 1902, 1901, 1908 and 1903 respectively,—if we say, at any rate, that their experimental study belongs to the present century. And we have already worn such topics threadbare? I should rather judge that we have hardly touched their fringe. How many decades or centuries they will engage the attention of psychologists, I do not know; the important thing is that we should do thoroughly such work upon them as can be compassed in a generation. Our descendants may ask so much of us; but we owe them nothing more; and though I also hope that two hundred years hence other questions may have replaced those of visual attributes and imaginal characters, of orientation in the rat and of the homing sense of terns, I am far more deeply concerned to sift the materials of discussion than to hurry debate to a conclusion.[21]

There remain the seceding branches, experimental pedagogy and the rest. In their regard, I think, the unhistorical nature of Watson's paper renders his exposition seriously misleading; it is psychology, and not behaviorism, that has shaped their course; and it is psychology, and not behaviorism, that they still look to for guidance. Meumann's *Lectures,* for example, are offered as an introduction to experimental pedagogy and its psychological foundations; the work is penetrated with psychology; the pedagogical experiment is said to be "for the most part the psychological experiment applied to the developing and working school-child."[22] But it is largely owing to Meumann that experimental pedagogy flourishes. Rivers chose the subject of his Croonian Lectures with the desire to show that experimental psychology may be of service to medicine.[23] Stern, who

[21] It is, perhaps, beyond my province to defend functional psychology; but I should not like to have written this sentence: "It is rather interesting that no functional psychologist has carefully distinguished between 'perception' (and this is true of the other psychological terms as well) as employed by the systematist, and 'perceptual process' as used in functional psychology" (*A,* 165). What, then, of Brentano, and of the many psychologists who have been inspired by him?

[22] E. Meumann, "Vorlesungen zur Einführung in die experimentelle Pädagogik und ihre psychologischen Grundlagen," I., 1911, 27.

[23] W. H. R. Rivers, "The Influence of Alcohol and Other Drugs on Fatigue," 1908, I, 121.

stands to the psychology of testimony in somewhat the same relation that Meumann bears to experimental pedagogy, is also through and through psychological. Binet, whose name is inseparably connected with the psychology of tests, might fairly be called an extremist in his devotion to introspection. Pick demands "eine psychologische Vertiefung der Aphasielehre," and makes constant use of laboratory material: "es ist höchste Zeit dass die Pathologie endlich von diesen Dingen Kenntnis nehme."[24] It is worth noting that Meumann, Stern and Binet—the men to whom we are chiefly indebted for experimental pedagogy, the psychology of testimony, and mental tests—would all have been brushed aside by Watson, a few years ago, as typically introspective psychologists; and it is worth noting also that they themselves look upon this later work, not as the negation of their psychological training, but as its direct extension and practical fulfilment. It is worth noting, again, that a man of Pick's authority ascribes the unprogressive state of psychopathology in large measure to an ignorance of current introspective psychology, and himself makes definite use of the "imageless thought, attitudes, and *Bewusstseinslage,* etc.," which Watson contemns.[25] I am not here depreciating behaviorism; but I think there is no justification for behaviorism's depreciation of psychology.[26]

[24] A. Pick, "Die agrammatischen Sprachstörungen: Studien zur psychologischen Grundlegung der Aphasielehre," 1913, I., 11, 58, etc.

[25] *A,* 163. The psychology of advertising, so far as it has gone, bears out my argument. Cf. D. Starch, "Principles of Advertising," 1910; W. D. Scott, "The Psychology of Advertising," 1912; W. A. Shryer, "Analytical Advertising," 1912; H. L. Hollingworth, "Advertising and Selling; Principles of Appeal and Response," 1913. The psychology of these works is not always of the severest type; but the attitude of the writers is unmistakably psychological.

[26] I have said nothing of the "esoteric" nature of introspection, because I have dealt with that charge in recent articles (*American Jour. Psych.,* XXIII., 1912, 427 ff., 485 ff.). In referring to my own work, Watson falls into the common mistake of confusing observation with theory. If he were to serve as observer in one of our studies on attention, he would have no difficulty, after a little practice, in passing the sensory judgments that we required of him. That is a matter of observation and report. Whether he would, after such participation in the actual work, accept our setting and interpretation of the results is another and a different question.

In his second article Watson discusses two topics "which may seem to many to be stumbling-blocks in the way of a free passage from structuralism to behaviorism." These topics, one sees with some surprise, are Image and Affection: with surprise, I say, because we had already been prepared to ignore consciousness and to eliminate introspection. It turns out, however, that the difficulty is methodological. For if the physiological counterpart of the image is cortical, then that mode of behavior which is to replace the introspective psychology of thought lies inaccessible within the skull. If "affection is a mental process distinct from cognition (*sic*)," then affection cannot be an "organic sensory response." So image and affection have to be dealt with; and Watson deals with them faithfully; the existence of the image is denied outright, and affection is carried willy-nilly to the periphery.

Watson offers three bits of evidence for his contention that "there are no centrally initiated processes." In the first place there are experimentalists who maintain that thought-processes may go on independently of imagery. In the second place there is no objective experimental evidence of the presence of different types of imagery. In the third place even the structuralists seek to reduce higher thought-processes to groups of obscure organic processes. I think that these arguments can be met in terms almost as brief as their statement. In the first place, the view that thought is independent of imagery hardly constitutes a presumption that there are no central processes of any kind. In the second place Fernald does not deny type, but asserts that "an individual's type can be adequately indicated only by an extended statement";[27] and that is the opinion now generally held by psychologists. But let us suppose that types cannot be indicated at all: by what logical inference may we pass from this negative finding to the denial of imagery? In the third place the reduction of thought to organic processes always implies in the background a cortical set corresponding to the *Aufgabe*. Watson, nevertheless, denies that there are centrally initiated processes, and proposes to find the behaviorist equivalent of thought in movements,

[27] M. R. Fernald, "The Diagnosis of Mental Imagery," *Psych. Monogr.*, XIV., 1, 1912, 128 ff.

chiefly, of the larynx. In the same way he finds the behaviorist parallel of affective process in tumescence and shrinkage of the organs of sex. These views are put forward as matters of hypothesis and of personal conviction, though they are also put forward with some confidence. Time and trial will prove their value.

Meanwhile, it would seem that Watson has in both cases, in the case of image as in that of affective process, overshot the logic of his position. The negative argument as regards imagery can never be proved in formal logic, to say nothing of the fact that it conflicts with a very large body of positive observation.[28] Logical confusion is shown plainly enough in the following remark: "I may have to grant a few sporadic cases of imagery to him who will not be otherwise convinced, but I insist that the images of such an one are sporadic, and as unnecessary to his well-being and *well-thinking* as a few hairs more or less on his head." If there are any images at all, then there are (on Watson's own showing) centrally initiated processes, and behaviorism is bound to take account of them; and his personal assurance that they are unnecessary to thought is offset at once by the assurance of Watt and others that thought does in fact go on in imaginal terms.[29] Science is concerned with empirical facts; and for the individual man of science to "insist" that certain facts of observation may be cancelled without loss to the science to whose subject-matter they belong is to incur, at the very least, the charge of a certain rashness of behavior.

Another logical objection seems to me to lie against Watson's procedure in this second article. All science works upon assumptions, psychology no less than the other sciences. Münsterberg, for instance, is wholly within his logical rights when he assumes that all conscious contents, without exception, may be transformed into sensations:[30] given his premises, they must be so transformed. Be-

[28] I quote a recent statement: "From an actual count of factors present in the recall of ten of our problems, we estimate that our investigation embraces approximately 200,000 images. . . . Of all our introspective data, about ninety per cent. are visual images" (E. O. Finkenbinder, *Amer. Journ. of Psych.*, XXV., 1914, 81).

[29] H. J. Watt, "Experimentelle Beiträge zu einer Theorie des Denkens," *Arch. f. d. ges. Psych.*, IV., 1905, 312; cf. my "Thought-processes," 1909, Lect. I.

[30] H. Münsterberg, "Grundzüge der Psychologie," I., 1900, 331.

haviorism would be equally within its logical rights in assuming that all central processes may be transformed into peripheral: given Watson's premises, they must be so transformed. But you cannot eat your cake and have it too. You may bring up facts in support of your choice of assumptions; and you may show the scientific results to which those assumptions lead; you may not, surely, offer these results, even hypothetically, as facts in proof of your assumptions. If we take up Münsterberg's position, we find nothing but sensations to work upon; but that is not evidence that Münsterberg's position is well-chosen. If we take up Watson's position, we find, perhaps, laryngeal movements and changes in the state of the sex-organs; but that discovery gives no logical support to the principles of his behaviorism.[31] It is, indeed, obvious that, if the larynx and the sex-organs prove refractory, the behavioristic equivalents of image and affection must just be put—hypothetically, again—somewhere else; and so on, and so forth; for it is a logical consequence of the position that somewhere on the periphery the required movements and changes are to be discovered; and the periphery is complex enough to suggest any number of localizations.[32]

[31] I do not deny that the empirical consequences of a particular theoretical attitude may serve *materially* to justify that attitude for its special day and generation; men have often worked successfully for a time though the logical foundations of their work were insecure. But the permanence of the structure depends on the solidity of the foundations, and to shirk their inspection is only to make "more haste" for the sake of "less speed."

[32] The reduction of pleasantness-unpleasantness at large to sheer sex-feeling is to me nothing else than nonsensical. But, like Watson, "I shall not attempt to develop the point further at the present time." It is, however, necessary to point out that the method of expression is not so ill bestead as Watson declares it to be. In his latest tabulation (*Arch. f. d. ges. Psych.*, XXXI., 1914, 27 ff.), E. Leschke finds 90 per cent. of substantial agreement in the investigations which he considers. The two principal sources of error are a disregard of neurasthenia and of vasomotor anomalies and—an inadequate psychological training of experimenter and observer!

I may, perhaps, be expected to say a word on Watson's criticism of my own doctrine of affection. The doctrine itself, I regret to say, he has not understood. But he has also mistaken the motives which led me to adopt it. My view that affection lacks the attribute of clearness is, he says, an assumption "arrived at largely in the interest of obtaining a structural differentiation between sensation and affection" (*B*, 426). As if a structural system would not be greatly simplified and, as system, improved by the reduc-

But the argument does not end here. I have formulated my criticism as if Watson's views were rigorously worked out, and as if his centrally initiated processes were conceived rigorously as physiological. That is, evidently, not the case; these processes are, in Watson's thought, both mental and physical; not only are brain-changes to be transformed into their equivalent peripheral changes, but the facts of psychology (as psychology is currently taken) are also to be carried, by way of behavioristic substitution, to the bodily periphery. The "required" peripheral changes are required—by the thoughts and emotions of an introspective psychology! And with that, by definition, behaviorism has nothing to do. The confusion here is plain, and the critical point need not be further labored. I must add, however, in the same connection, that I do not understand Watson's attitude to sensation. He admits that there are special cutaneous nerves "which mediate pain." He thinks that imagery is the key of the introspective stronghold: "all the outer defences might be given over to the enemy." These utterances seem to imply that sensation, if not part of the subject-matter of behaviorism, is at least neutral ground between that and introspective psychology; whereas, in the earlier article, sensation was definitely assigned to psychology.[33] Logically, I do not see how a behaviorist, in Watson's sense, can know anything of pain. I regard sensations as introspective material on precisely the same level with images; and I should challenge the behaviorist to replace or duplicate, in his universalistic terms, the various observations recorded, for example, in Stumpf's "Tonpsychologie," or in Hering's new "Lichtsinn."[34]

tion of affection to organic sensation! I only wish that I could see my way clear to it. J. R. Angell recognized the temptation in *Philos. Rev.*, XIX., 1910, 322; Watson's comment puts the cart before the horse.

[33] *A*, 164.

[34] C. Stumpf, "Tonpsychologie," I., 1883, Vorwort; E. Hering, "Zur Lehre vom Lichtsinne" [1874], 1878, 72, 106. "Der . . . Weg, welcher von den Aetherschwingungen ausgeht, hat bis jetzt, so weit es sich nicht blos um die Schicksale der Lichtstrahlen in den optischen Medien, also lediglich um eine Application der physikalischen Optik auf's Auge handelte, noch zu keinem Ergebnisse geführt"; "Ich war immer der Ansicht, dass die grossen Aufgaben, welche der Physiologie und insbesondere der Nervenphysiologie gestellt sind, am zweckmässigsten, ähnlich einer Tunnelbohrung, von zwei Seiten zugleich in Angriff genommen werden, nämlich nicht nur von der physikalisch-chemischen Seite, sondern auch von der psychischen."

All in all, this paper on Image and Affection, while it is written with a truly scientific candor, shows, I think, that the author has imperfectly grasped the logic of the situation which he has himself created.

In trying, now, to appraise Watson's proposals as a whole, we must begin by clearing them of their personal and accidental accompaniments. Watson demands a psychology "which concerns itself with human life" and whose "problems vitally concern human interest." He ascribes to such a psychology the practical goal of the control of behavior, the regulation and control of evolution in general; that is to say, he connects it with euthenics and eugenics. These expressions give his proposed psychology the stamp of a technology: for science goes its way without regard to human interests and without aiming at any practical goal; science is a transcription of the world of experience from a particular standpoint, deliberately adopted at the outset and deliberately maintained; the pursuit of a practical end is the earmark of a technology. And how does that matter in the present context? It matters very greatly. Watson is asking us, in effect, to exchange a science for a technology; and that exchange is impossible; for a technology draws not upon one but upon many sciences, and draws upon many other sources than science; and so the striking of a balance-sheet between a given science and a given technology is out of the question. I said above that behaviorism can never replace psychology because the scientific standpoints of the two disciplines are different; we now see that Watson's behaviorism can never replace psychology because the one is technological, the other scientific. This technological coloring, while it strengthens the emotional appeal of Watson's plea, is nevertheless not of the essence of behaviorism. The behaviorist's position, as we shall see, may be outlined in the plain black and white of science.

The two articles are characterized, again, by the recurring note of hurry, of impatience. Fifty-odd years gone, and we have accomplished so little: two hundred years, and shall we have accomplished much more? Surely it would be well to sweep the field clear, to forget the past, and to start the race anew! But all reformers, I

suppose, are likely to be impatient; and their impatience does not affect the value of their proposed reforms. We need not regard this hurry, either, as of the essence of behaviorism. Watson himself, in less fervid mood, might not grudge us a little time for the study of his plans,—would even recognize, I believe, that our hasty acceptance of them, without due consideration, must be more dangerous than a reasonable delay.

So we come at last to behaviorism itself; and what I take that to be I can best indicate by a parallel. In the disciplines which we call physiological psychology and psychophysiology we are interested, with slight difference of emphasis, in the two aspects of certain phenomena of the living organism; we seek to couple physiological with psychological, psychological with physiological, and so to get a complete description of the psychophysical. We may, now, in just the same way, speak of biological psychology and of psychobiology; indeed, those terms are already in use, and their general significance is plain. But here is the context to which behaviorism, if I understand it aright, must of necessity belong; it is the biological side of a biological psychology or of a psychobiology; I cannot make it more, and I do not think that its practitioners can make it less. The argument is as follows:

The behaviorist, as Watson describes him, also studies certain phenomena of the living organism. In theory, he may study these phenomena in either of two different ways. He may regard them as phenomena simply, as last facts, as things given, as phenomena to be taken at their face value and described and explained in their own right: then, he is working in what we are accustomed to call biology; he has adopted no new standpoint and needs no new name. Or again he may regard them as symptomatic; as reporting, expressing, indicating, leading up to something beyond themselves; as claiming detailed study, not only in their own right as data of biology, but also because of this further and specific character of report or expression. Here is ground for a discipline other than biology; a novel point of view has been attained. At once, however, the question arises: What, then, is it that the phenomena report or express? Of what are they symptomatic? The answer seems obvious: they are symptomatic of

behavior. And the answer seems satisfactory—until we remember that the phenomena, by hypothesis, *are* behavior, "behavior material," "behavior data," and that a phenomenon cannot both "be" and "be a symptom of" the same thing. I see no way out of this dilemma. Either the behaviorist is just biologist; and in that case he has no nearer relation to psychology than have his coworkers who are content to call themselves biologists: or the behaviorist sees expression where the biologist sees ultimate fact; and in that case he may equally well be called psychobiologist, seeing that the phenomena expressed or reported by the organic changes which he studies cannot be anything else than psychical.[35]

But if this conclusion is sound, it means two things. It means that behaviorism is correlated with a psychology, with some sort of psychology in the usual sense; and it means that behaviorism must take account of all kinds of organic changes, and not merely of those occurring at the periphery. I believe that both of these consequences must be accepted. Consider again, for example, Watson's reduction of thought to delicate movements of the larynx: those movements are movements of incipient or vestigial articulation. But words, as Watson seems to have forgotten, are also meanings; and meanings take us either to the nervous center—or to psychology; they take us, in fact, to both. Moreover, the very problem of these laryngeal movements is given to the behaviorist by psychology: how would he have lighted on the idea of transforming thought into movement unless psychology had made him acquainted with thought? I do not say that the incentive will come always or must necessarily come from the psychological side; there will be give and take; but it is none the less clear that behaviorism and psychology are, in this context, correlative; and that though an individual student may wisely and successfully confine himself to the study of behavior,—yes, and may all his life maintain a polemical attitude to psychology proper,—it is yet impossible to have a science of behaviorism independent of all psychology. It is equally impossible, of course, within the same context of psychobiology, to have an independent science of psychology; the two halves are essential to the single whole; and the psychology of

[35] Cf. with this paragraph *A*, 158 ff.

the behaviorist will, in matters of selection, emphasis, arrangement, terminology, perspective, differ from general psychology just as behaviorism itself differs from general biology.[36]

We thus conclude that to say, as was said above, "psychology would begin where a completed behaviorism left off," is really to say too little. The psychology which is correlated with behaviorism begins when behaviorism begins, and the fortunes of the two are bound up in the same bundle. Psychobiology will run the same course as psychophysiology and psychophysics. It is now, I suppose, in its first phase, when pioneer work brings in gross and tangible returns. Next will come the period of revision, of elaboration of details,—a period of discouragement, perhaps, as the former was a period of elation. And then will follow the period of slow and steady progress, varied by a certain amount of wholesome interruption. Meanwhile introspective psychology, which is now entering upon this third stage of its scientific career, will go quietly about its task, wishing the new movement all success, but declining—with the mild persistence natural to matters of fact—either to be eliminated or to be ignored.

[36] At this point we become involved in the controversy regarding the possibility of an "animal psychology." I have no wish to avoid that issue, though I must postpone its full discussion for another time. I believe that an animal psychology is definitely possible; I think that with the law of continuity as basal presupposition, and with the argument from analogy for use in the concrete case, the science may be established. Meantime I have elsewhere expressed my agreement with Watson that there can, in strictness, be no objective criterion of the psychical (*A*, 161).

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